

CLAIMS

1 1. A device for inspecting an assembly including a surface coating
2 containing magnetic radar absorbing materials on a conductive surface, the
3 device comprising:

4 first and second hollow conductive waveguides having open first ends
5 and closed off second ends, said first waveguide adapted to direct
6 electromagnetic radiation to the surface of the coating and said second
7 waveguide adapted to receive electromagnetic radiation reflected off the
8 surface coating; said first and second waveguides at an acute angle to each
9 other;

10 third and forth waveguides made of a dielectric material, said third and
11 fourth wave guides having first ends extending into said first ends of said first
12 and second wave guides and second ends extending outward from said first
13 ends of said first and second wave guides;

14 first means coupled to said second end of said first waveguide for
15 delivering electromagnetic energy to said first wave guide and to said third
16 waveguide for transmission to the assembly ; and

17 second means coupled to said second end of said second waveguide
18 for receiving electromagnetic energy transmitted by said first means to the
19 assembly and reflected back to said fourth waveguide.

1 2. The device as set forth in claim 1 comprising:

2 said third and fourth wave guides having top and bottom surfaces and
3 first and second side surfaces, a portion of said firsts end of said third and
4 fourth wave guides tapered along the top and bottom surfaces to and edge,
5 and a portion of said second ends of said third and fourth wave guides tapered
6 along there first and second side surfaces to and edge.

1 3. The device as set forth in claim 2 comprising said third and fourth
2 waveguides are made of solid pieces of dielectric material.

1 4. The device as set forth in claim 3 comprising said acute angle is
2 generally ten degrees.

1 5. The device as set forth in claim 4 comprising said third and fourth
2 waveguides are made of Polytetrafluoroethylene.

1 6. A device for inspecting an assembly including a surface coating
2 containing magnetic radar absorbing materials on a conductive surface, the
3 device comprising:

4 a first means for transmitting an electromagnetic signal to the assembly,
5 said first means comprising:

6 a electromagnetic signal generating means; and

7 a first waveguide made of metal having first and second ends,
8 said first waveguide for receiving the electromagnetic signal at said first
9 end and transmitting the electromagnetic signal toward said second
10 end;

11 a first waveguide made of a dielectric material, said second
12 waveguide having a first end extending into said second end of said
13 first waveguide and a second end extending outward from said second
14 end of said first wave guide; and

15 a second means for receiving the electromagnetic signal reflected back
16 from the assembly, said second means comprising:

17 a electromagnetic signal receiving means; and

18 a third waveguide made of metal having first and second ends,
19 said third wave guide for receiving the electromagnetic signal at said
20 second end transmitting the electromagnetic signal toward said first
21 end; and

22 a fourth waveguide made of a dielectric material, said fourth
23 waveguide having a first end extending into said second end of said third
24 waveguide and a second end extending outward from said second end of
25 said first wave guide for receiving electromagnetic radiation reflected from
26 the assembly.

1 7. The device as set forth in claim 6 comprising:
2 said second and fourth waveguides having top and bottom surfaces
3 and first and second side surfaces, a portion of said firsts end of said third and
4 fourth wave guides tapered along the top and bottom surfaces to and edge,
5 and a portion of said second ends of said third and fourth wave guides tapered
6 along there first and second side surfaces to and edge.

1 8. The device as set forth in claim 8 comprising said second and fourth
2 waveguides are made of solid pieces of dielectric material.

1 9. The device as set forth in claim 9 comprising;
2 said first and second waveguide having longitudinal axis, said
3 longitudinal axis of said first and second wave guides aligned with each other;
4 and
5 said third and fourth waveguides having longitudinal axis, said
6 longitudinal axis of said third and fourth wave guides aligned with each other.

1 10. The device as set forth in claim 9 wherein said longitudinal axis of
2 said first and second waveguides are at an acute angle to said longitudinal
3 axis of said third and fourth waveguides.

1 11. The device as set forth in claim 10 wherein said acute angle is seven
2 ten degrees.

1 12. The device as set forth in claim 11 comprising said third and fourth
2 waveguides are made of Polytetrafluoroethylene.

1 13. A device for inspecting an assembly including a surface coating
2 containing magnetic radar absorbing materials on a conductive surface, the
3 device comprising:

4 a first means for transmitting an electromagnetic signal to the assembly,
5 said first means including a first waveguide made of a conductive material
6 coupled in series to a second waveguide made of a dielectric material; and

7 a second means for receiving the portion of the electromagnetic signal
8 reflected from the assembly, said second means including a third waveguide
9 made of a conductive material coupled in series to a fourth waveguide made
10 of a dielectric material;

11 such that electromagnetic signal is transmitted from said first
12 waveguide to said second waveguide on to the assembly and the portion of
13 the electromagnetic signal reflected off the assembly is received by said
14 fourth waveguide and transmitted to said third waveguide.

1 14. The device as set forth in claim 13 comprising:

2 said second and fourth waveguides having top and bottom surfaces
3 and first and second side surfaces, a portion of said firsts end of said third and
4 fourth waveguides tapered along the top and bottom surfaces to and edge,
5 and a portion of said second ends of said third and fourth waveguides tapered
6 along there first and second side surfaces to and edge.

1 15. The device as set forth in claim 14 comprising said second and fourth
2 waveguides are made of solid pieces of dielectric material.

1 16. The device as set forth in claim 15 comprising;
2 said first and second waveguide having longitudinal axis, said
3 longitudinal axis of said first and second waveguides aligned with each other;
4 and

5 said third and fourth waveguides having longitudinal axis, said
6 longitudinal axis of said third and fourth wave guides aligned with each other.

7 17. The device as set forth in claim 16 wherein said longitudinal axis of
8 said first and second waves guides are at an acute angle to said longitudinal
9 axis of said third and fourth waveguides.

1 18. The device as set forth in claim 17 wherein said acute angle is seven
2 ten degrees.

1 19. The device as set forth in claim 18 comprising said third and fourth
2 waveguides are made of Polytetrafluoroethylene.